Major Stormwater Management Plan
(Major SWMP)
For
NEUMANN PARCEL MAP
TENTATIVE PARCEL MAP 20962

July 14, 2005
Revisions:
February 21, 2007
June 18, 2010
LOG NO. 05-09-021

Prepared for:

Tim and Christine Neumann
1191 North Ridgeline Drive
Orange, California 92869
(760) 458-9127

Prepared by:

ERB ENGINEERING, INC.
AMERICAN INDIAN FIRM

ERB ENGINEERING, INC.
12320 STOWE DRIVE, SUITE E
POWAY, CALIFORNIA 92064
(858) 748-2130 • Fax (858)748-6089

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan have been prepared under the direction of the following Registered Civil Engineer and meet the requirements of Regional Water Quality Control Board Order R9-2007-0001 and subsequent amendments.

_____ _____

Matthew J. Miller, RCE #67144 Date

The Major Stormwater Management Plan (Major SWMP) must be completed in its entirety and accompany applications to the County for a permit or approval associated with certain types of development projects. To determine whether your project is required to submit a Major or Minor SWMP, please reference the County's Stormwater Intake Form for Development Projects.

Project Name:	Neumann Parcel Map
Project Location:	18489 Ramona View Drive, Ramona, CA 92065
Permit Number (Land Development Projects):	TPM 20962, Rpl 3
Work Authorization Number (CIP **only):**	
Applicant:	Tim & Christine Neumann, Trustees, Neumann Family Trust
Applicant's Address:	1191 N. Ridgeline Dr, Orange, CA 92869
Plan Prepared By (Leave *blank if same as applicant):*	ERB Engineering, Inc
Preparer's Address:	12320 Stowe Dr, Suite E, Poway, CA 92064
Date:	June 18, 2010

The County of San Diego Watershed Protection, Storm Water Management, and Discharge Control Ordinance (WPO) (Ordinance No. 9926) requires all applications for a permit or approval associated with a Land Disturbance Activity to be accompanied by a Storm Water Management Plan (SWMP) (section 67.806.b). The purpose of the SWMP is to describe how the project will minimize the short and long-term impacts on receiving water quality. Projects that meet the criteria for a priority development project are required to prepare a Major SWMP.

Since the SWMP is a living document, revisions may be necessary during various stages of approval by the County. Please provide the approval information requested below.

Project Stages	Does the SWMP need revisions?		If YES, Provide Revision Date
	YES	NO	
Initial Submittal	☒	☐	February 21, 2007
Biological Update	☒	☐	June 18, 2010
	☐	☐	

Completion of the following checklists and attachments will fulfill the requirements of a Major SWMP for the project listed above.

STEP 1

PRIORITY DEVELOPMENT PROJECT DETERMINATION

TABLE 1: IS THE PROJECT IN ANY OF THESE CATEGORIES?

Yes ☐	No ☒	**A**	**Housing subdivisions of 10 or more dwelling units.** Examples: single-family homes, multi-family homes, condominiums, and apartments.
Yes ☐	No ☒	**B**	**Commercial—greater than one acre.** Any development other than heavy industry or residential. Examples: hospitals; laboratories and other medical facilities; educational institutions; recreational facilities; municipal facilities; commercial nurseries; multi-apartment buildings; car wash facilities; mini-malls and other business complexes; shopping malls; hotels; office buildings; public warehouses; automotive dealerships; airfields; and other light industrial facilities.
Yes ☐	No ☒	**C**	**Heavy industry—greater than one acre.** Examples: manufacturing plants, food processing plants, metal working facilities, printing plants, and fleet storage areas (bus, truck, etc.).
Yes ☐	No ☒	**D**	**Automotive repair shops.** A facility categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.
Yes ☐	No ☒	**E**	**Restaurants.** Any facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), where the land area for development is greater than 5,000 square feet. Restaurants where land development is less than 5,000 square feet shall meet all SUSMP requirements except for structural treatment BMP and numeric sizing criteria requirements and hydromodification requirements.
Yes ☒	No ☐	**F**	**Hillside development greater than 5,000 square feet.** Any development that creates 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions, where the development will grade on any natural slope that is twenty-five percent or greater.
Yes ☐	No ☒	**G**	**Environmentally Sensitive Areas (ESAs).** All development located within or directly adjacent to or discharging directly to an ESA (where discharges from the development or redevelopment will enter receiving waters within the ESA), which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition. "Directly adjacent" means situated within 200 feet of the ESA. "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands.
Yes ☐	No ☒	**H**	**Parking lots 5,000 square feet or more** or with 15 or more parking spaces and potentially exposed to urban runoff.
Yes ☒	No ☐	**I**	**Street, roads, highways, and freeways.** Any paved surface that is 5,000 square feet or greater used for the transportation of automobiles, trucks, motorcycles, and other vehicles.
Yes ☐	No ☒	**J**	**Retail Gasoline Outlets (RGOs)** that are: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.

To use the table, review each definition A through K. If any of the definitions match, the project is a Priority Development Project. Note some thresholds are defined by square footage of impervious area created; others by the total area of the development. Please see special requirements for previously developed sites and project exemptions on page 6 of the County SUSMP.

STEP 2_
PROJECT STORMWATER QUALITY DETERMINATION

Total Project Site Area __39.6 Acres

Estimated amount of disturbed acreage: _____ (Acres or ft^2)
(If >1 acre, you must also provide a WDID number from the SWRCB)

Complete A through C and the calculations below to determine the amount of impervious surface on your project before and after construction.

A. Total size of project site: __39.6 Acres

B. Total impervious area (including roof tops) before construction _____ (Acres or ft^2)

C. Total impervious area (including roof tops) after construction __0.68 Acres

Calculate percent impervious before construction: B/A = _____%
Calculate percent impervious after construction: C/A = ___1.71%

Please provide detailed descriptions regarding the following questions:

TABLE 2: PROJECT SPECIFIC STORMWATER ANALYSIS

1.	Please provide a brief description of the project.	
	Located at the end of Ramona View Drive (a private road) in Ramona, the Project involves subdividing the existing 39.6 acre parcel into four separate parcels. Parcels 1 & 2 contain exiting single family dwellings. The existing and future dwellings are accessed off the private road. It will be extended to provide access to Parcel 4with new driveways to service Parcels 3 & 4. The extension of the private road will be widened to 24' and transitioned to 16' after connection to an existing driveway for Parcel 1.	
2.	Describe the current and proposed zoning and land use designation.	
	The current zoning is designated as A70 in General Plan Regional Category EDA and Land Use Designations of #18 & #19. There is no proposed change.	
3.	Describe the pre-project and post-project topography of the project. (Show on Plan)	
	Pre- construction topography is predominantly rocky hills with scattered shrubs. Since most of the Project area will be in a proposed open space easement and the extension of the private road will follow existing topographic contours, there will be little change to the overall topography.	
4.	Describe the soil classification, permeability, erodibility, and depth to groundwater for LID and Treatment BMP consideration. (Show on Plan) If infiltration BMPs are proposed, a Geotechnical Engineer must certify infiltration BMPs in Attachment E.	
	The soil in the project area is of Hydrologic Soil Group B. Soils have moderate infiltration rate when thoroughly wetted; chiefly soils that are moderately deep to deep, moderately well drained to well drained, and moderately coarse textured. Rate of water transmission is moderate. Per the San Diego Soil Survey (1973); permeability is high, erodibility is medium to high and the depth to water is >80"	
5.	Describe if contaminated or hazardous soils are within the project area. (Show on Plan)	
	There are no known contaminated soils, fills or hazardous wastes within the Project.	
6.	Describe the existing site drainage and natural hydrologic features. (Show on Plan).	
	The Project has several intermittent, natural drainage channels which drain areas to the east of the site. One of these channels that flows south of existing development for Parcel 1 has an existing culvert beneath the driveway that serves that development. Localized, open systems drain the each of the exiting developed areas of Parcels 1 & 2. Both of these parcels existing driveways utilize AC berms that channel the runoff to Ramona View Dr. where it is discharged into natural drainage channels.	
7.	Describe site features and conditions that constrain, or provide opportunities for stormwater control, such as LID features.	
	The Project minimizes disturbance to existing vegetation by retaining existing developed areas, minimizes additional imperviousness, utilizes existing drainage courses and introduces vegetated swales that take advantage of the permeability of existing soil.	
8.	Is this project within the environmentally sensitive areas as defined on the maps in Appendix A of the *County of San Diego Standard Urban Storm Water Mitigation Plan for Land Development and Public Improvement Projects?*	
	Yes☐	No☒
9.	Is this an emergency project?	
	Yes☐	No☒

CHANNELS & DRAINAGES

Complete the following checklist to determine if the project includes work in channels.

TABLE 3: PROJECT SPECIFIC STORMWATER ANALYSIS

No.	CRITERIA	YES	NO	N/A	COMMENTS
1	Will the project include work in channels?	☐	☒	☐	If YES go to 2. If NO go to 13.
2	Will the project increase velocity or volume of downstream flow?	☐	☐	☐	If YES go to. 6.
3	Will the project discharge to unlined channels?	☐	☐	☐	If YES go to. 6.
4	Will the project increase potential sediment load of downstream flow?	☐	☐	☐	If YES go to. 6.
5	Will the project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect downstream channel stability?	☐	☐	☐	If YES go to. 8.
6	Review channel lining materials and design for stream bank erosion	☐	☐	☐	Continue to 7.
7	Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity.	☐	☐	☐	Continue to 8.
8	Include, where appropriate, energy dissipation devices at culverts.	☐	☐	☐	Continue to 9.
9	Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour.	☐	☐	☐	Continue to 10.
10	Include, if appropriate, detention facilities to reduce peak discharges.	☐	☐	☐	Continue to 11.
11	“Hardening“ natural downstream areas to prevent erosion is not an acceptable technique for protecting channel slopes, unless pre-development conditions aredetermined to be so erosive that hardening would be required even in the absence of the proposed development.	☐	☐	☐	Continue to 12.
12	Provide other design principles that are comparable and equally effective.	☐	☐	☐	Continue to 13.
13	End	☒	☐	☐	

I f

TEMPORARY CONSTRUCTION BMPS

Please check the construction BMPs that may be implemented during construction of the project. The applicant will be responsible for the placement and maintenance of the BMPs incorporated into the final project design.

- ☒ Silt Fence
- ☒ Fiber Rolls
- ☒ Street Sweeping and Vacuuming
- ☒ Storm Drain Inlet Protection
- ☒ Stockpile Management
- ☒ Solid Waste Management
- ☒ Stabilized Construction Entrance/Exit
- ☒ Dewatering Operations
- ☒ Vehicle and Equipment Maintenance
- ☒ Desilting Basin
- ☒ Gravel Bag Berm
- ☒ Sandbag Barrier
- ☒ Material Delivery and Storage
- ☒ Spill Prevention and Control
- ☒ Concrete Waste Management
- ☒ Water Conservation Practices
- ☒ Paving and Grinding Operations

Any minor slopes created incidental to construction and not subject to a major or minor grading permit shall be protected by covering with plastic or tarp prior to a rain event, and shall have vegetative cover reestablished within 180 days of completion of the slope and prior to final building approval.

EXCEPTIONAL THREAT TO WATER QUALITY DETERMINATION

Complete the checklist below to determine if a proposed project will pose an "exceptional threat to water quality," and therefore require Advanced Treatment Best Management Practices during the construction phase.

TABLE 4: EXCEPTIONAL THREAT TO WATER QUALITY DETERMINATION

No.	CRITERIA	YES	NO	INFORMATION
1	Is all or part of the proposed project site within 200 feet of waters named on the Clean Water Act (CWA) Section 303(d) list of Water Quality Limited Segments as impaired for sedimentation and/or turbidity? Current 303d list may be obtained from the following site: http://www.swrcb.ca.gov/tmdl/docs/303dlists2006/approved/r9_06_303d_reqtmdls.pdf	☐	☒	If YES, continue to 2. If NO, go to 5.
2	Will the project disturb more than 5 acres, including all phases of the development?	☐	☐	If YES, continue to 3. If NO, go to 5.
3	Will the project disturb slopes that are steeper than 4:1 (horizontal:vertical) with at least 10 feet of relief, and that drain toward the 303(d) listed receiving water for sedimentation and/or turbidity?	☐	☐	If YES, continue to 4. If NO, go to 5.
4	Will the project disturb soils with a predominance of USDA-NRCS Erosion factors k_f greater than or equal to 0.4?	☐	☐	If YES, continue to 6. If NO, go to 5.
5	Project is not required to use Advanced Treatment BMPs.	☒	☐	Document for Project Files by referencing this checklist.
6	Project poses an "exceptional threat to water quality" and is required to use Advanced Treatment BMPs.	☐	☒	Advanced Treatment BMPs must be consistent with WPO section 67.811(b)(20)(D) performance criteria

Exemption potentially available for projects that require advanced treatment: Project proponent may perform a Revised Universal Soil Loss Equation, Version 2 (RUSLE 2), Modified Universal Soil Loss Equation (MUSLE), or similar analysis that shows to the County official's satisfaction that advanced treatment is not required

STEP 3

HYDROMODIFICATION DETERMINATION

The following questions provide a guide to collecting information relevant to hydromodification management issues.

TABLE 5: HYDROMODIFICATION DETERMINATION

No.	QUESTIONS	YES	NO	Information
1	Will the proposed project disturb 50 or more acres of land? (Including all phases of development)	☐	☒	If YES, continue to 2. If NO, go to 6.
2	Would the project site discharge directly into channels that are concrete-lined or significantly hardened such as with rip-rap, sackcrete, etc, downstream to their outfall into bays or the ocean?	☐	☐	If NO, continue to 3. If YES, go to 6.
3	Would the project site discharge directly into underground storm drains discharging directly to bays or the ocean?	☐	☐	If NO, continue to 4. If YES, go to 6.
4	Would the project site discharge directly to a channel (lined or un-lined) and the combined impervious surfaces downstream from the project site to discharge at the ocean or bay are 70% or greater?	☐	☐	If NO, continue to 5. If YES, go to 6.
5	Project is required to manage hydromodification impacts.	☐	☐	Hydromodification Management Required as described in Section 67.812 b(4) of the WPO.
6	Project is not required to manage hydromodification impacts.	☒	☐	Hydromodification Exempt. Keep on file.

An exemption is potentially available for projects that are required (No. 5. in Table 5 above) to manage hydromodification impacts: The project proponent may conduct an independent geomorphic study to determine the project's full hydromodification impact. The study must incorporate sediment transport modeling across the range of geomorphically-significant flows and demonstrate to the County's satisfaction that the project flows and sediment reductions will not detrimentally affect the receiving water to qualify for the exemption.

STEP 4

POLLUTANTS OF CONCERN DETERMINATION

WATERSHED

Please check the watershed(s) for the project.

☐San Juan 901	☐Santa Margarita 902	☐San Luis Rey 903	☐Carlsbad 904
☒San Dieguito 905	☐Penasquitos 906	☐San Diego 907	☐Sweetwater 909
☐Otay 910	☐Tijuana 911	☐Whitewater 719	☐Clark 720
☐West Salton 721	☐Anza Borrego 722	☐Imperial 723	

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

HYDROLOGIC SUB-AREA NAME AND NUMBER(S)

Number	Name
904.51	Ramona

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

SURFACE WATERS that each project discharge point proposes to discharge to. List the impairments identified in Table 7.

SURFACE WATERS (river, creek, stream, etc.)	Hydrologic Unit Basin Number	Impairment(s) listed [303(d) listed waters or waters with established TMDLs]	Distance to Project
Hatfield Creek	904.51	-none-	0.75 mile
Santa Maria Creek	904.51	-none-	0.66 mile
Sant Ysabel Creek	905.32	-none-	12 miles
Lake Hodges	905.21	Color, manganese, nitrogen, pH, phosphorous, turbidity	18 miles
San Dieguito River	905.11	-none-	23 miles
Pacific Ocean Shoreline	905.11	Bacteria	33 miles

http://www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303dlists2006/epa/r9_06_303d_reqtmdls.pdf

GROUND WATERS

Ground Waters	Hydrologic Unit Basin Number	MUN	AGR	IND	PROC	GWR
Ramona HSA	**905.41**	●	●	●	●	
San Pasqual HA	**905.30**	●	●	●		
Hodges HA	**905.20**	●	●	●		
Solana Beach	**905.10**	●	●	●		

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

+ Excepted from Municipal ● Existing Beneficial Use ○ Potential Beneficial Use

SURFACE WATERS

Ground Waters	Hydrologic Unit Basin Number	MUN	AGR	IND	PROC	GWR	FRESH	POW	REC1	REC2	BIOL	WARM	COLD	WILD	RARE	SPWN
Hatfield Cr.	**905.41**	●	●	●	●				●	●		●		●		
Santa Maria Cr.	**905.32**	●	●	●	●					●		●		●		
San Dieguito R.	**905.21**	●	●	●	●				●	●	●	●	●	●	●	
San Dieguito R.	**905.11**	+	○	○					●	●		●	●	●		●

http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

+ Excepted from Municipal ● Existing Beneficial Use ○ Potential Beneficial Use

PROJECT ANTICIPATED AND POTENTIAL POLLUTANTS

Using Table 6, identify pollutants that are anticipated to be generated from the proposed priority project categories. Pollutants associated with any hazardous material sites that have been remediated or are not threatened by the proposed project are not considered a pollutant of concern.

TABLE 6: ANTICIPATED AND POTENTIAL POLLUTANTS GENERATED BY LAND USE TYPE

	General Pollutant Categories								
PDP Categories	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P	X
Commercial Development 1 acre or greater	P(1)	P(1)		P(2)	X	P(5)	X	P(3)	P(5)
Heavy industry /industrial development	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	
Hillside Development >5,000 ft^2	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Retail Gasoline Outlets			X	X	X	X	X		
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(3)	X		

X = anticipated
P = potential

(1) A potential pollutant if landscaping exists on-site.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

PROJECT POLLUTANTS OF CONCERN SUMMARY TABLE

Please summarize the identified project pollutant of concern by checking the appropriate boxes in the table below and list any surface water impairments identified. Pollutants anticipated to be generated by the project, which are also causing impairment of receiving waters, shall be considered the primary pollutants of concern. For projects where no primary pollutants of concern exist, those pollutants identified as anticipated shall be considered secondary pollutants of concern.

TABLE 7: PROJECT POLLUTANTS OF CONCERN

Pollutant Category	Anticipated (X)	Potential (P)	Surface Water Impairments
Sediments	X		Lake Hodges
Nutrients	X	P	Lake Hodges
Heavy Metals	X		Lake Hodges
Organic Compounds	X		
Trash & Debris	X		
Oxygen Demanding Substances	X	P	
Oil & Grease	X		
Bacteria & Viruses			Pacific Ocean Shoreline
Pesticides	X		

STEP 5

LID AND SITE DESIGN STRATEGIES

Each numbered item below is a Low Impact Development (LID) requirement of the WPO. Please check the box(s) under each number that best describes the LID BMP(s) and Site Design Strategies selected for this project.

TABLE 8: LID AND SITE DESIGN

1. Conserve natural Areas, Soils, and Vegetation
☒Preserve well draining soils (Type A or B)
☒Preserve Significant Trees
☒Preserve critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions
☐Other. Description:
2. Minimize Disturbance to Natural Drainages
☒Set-back development envelope from drainages
☒Restrict heavy construction equipment access to planned green/open space areas
☐Other. Description:
3. Minimize and Disconnect Impervious Surfaces (see 5)
☒Clustered Lot Design
☒Items checked in 5?
☐Other. Description:
4. Minimize Soil Compaction
☒Restrict heavy construction equipment access to planned green/open space areas
☒Re-till soils compacted by construction vehicles/equipment
☒Collect & re-use upper soil layers of development site containing organic Materials
☐Other. Description:
5. Drain Runoff from Impervious Surfaces to Pervious Areas
LID Street & Road Design
☒Curb-cuts to landscaping
☒Rural Swales
☐Concave Median
☐Cul-de-sac Landscaping Design
☒Other. Description: Permeable trail surface receiving sheet flow
LID Parking Lot Design
☐Permeable Pavements

☐Curb-cuts to landscaping
☐Other. Description:
LID Driveway, Sidewalk, Bike-path Design
☐Permeable Pavements
☒Pitch pavements toward landscaping
☒Other. Description: Pervious Surfacing (DG)
LID Building Design
☐Cisterns & Rain Barrels
☐Downspout to swale
☐Vegetated Roofs
☐Other. Description:
LID Landscaping Design
☐Soil Amendments
☒Reuse of Native Soils
☒Smart Irrigation Systems
☐Street Trees
☐Other. Description:
6. Minimize erosion from slopes
☒Disturb existing slopes only when necessary
☒Minimize cut and fill areas to reduce slope lengths
☐Incorporate retaining walls to reduce steepness of slopes or to shorten slopes
☐Provide benches or terraces on high cut and fill slopes to reduce concentration of flows
☒Rounding and shaping slopes to reduce concentrated flow
☒Collect concentrated flows in stabilized drains and channels
☐Other. Description:

STEP 6

SOURCE CONTROL

Please complete the checklist on the following pages to determine Source Control BMPs. Below is instruction on how to use the checklist. (Also see instructions on page 40 of the *SUSMP)*

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.

2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your Source Control Exhibit in Attachment B.

3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in a table in your Project-Specific SUSMP.

Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternatives.

Trash Storage areas designed with an impervious surface, designed not to allow run-on from adjoining areas, screened or walled to prevent off-site transport of trash; and have attached lids on all trash containers that exclude rain, or roof or awning to minimize direct precipitation.

Private Roads use a rural swale system where the first flush goes directly into vegetated swale or gravel shoulder, culverts under driveways or portions of an urban curb/swale system where the pavement slopes to curb, periodic swale inlets drain to vegetated area, swale or biofilter.

Uncovered driveways and temporary or guest parking on private residential lots paved with a permeable surface; or, designed to drain into landscaping.

Efficient irrigation design insures irrigation systems to each landscape area's specific water requirements, employs rain shutoff devices to prevent irrigation after precipitation, and uses flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines and monitoring.

Use the format in Table 9 below to summarize the project Source Control BMPs. Incorporate all identified Source Control BMPs in your Source Control Exhibit in Attachment B.

TABLE 9: PROJECT SOURCE CONTROL BMPS

Potential source of runoff pollutants	*Permanent source control BMPs*	*Operational source control BMPs*
Landscape/ Outdoor Pesticide Use	Preserve existing native trees, shrubs, and ground cover. Landscape design minimizes irrigation and runoff, promotes surface infiltration where appropriate, and minimizes the use of fertilizers and pesticides. Maintain landscaping using minimum or no pesticides. Provide IPM information to new owners, lessees and operators. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially adjacent to hardscape.
Refuse areas	Trash receptacles located outdoors and the area or receptacles will be covered. The storage area is graded to prevent run-on, paved to prevent infiltration and bermed to prevent runoff. Refuse and recyclables will be removed on a regular basis by a regulated and licensed hauler and disposed at a certified landfill and/or recycling facility.	Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Inspect and pick up litter daily and clean up spills immediately.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Source Control Exhibit, Attachment B**	3 **Permanent Controls—List in SUSMP Table and Narrative**	4 **Operational BMPs—Include in SUSMP Table and Narrative**
☐**A.** On-site storm drain inlets	☐Locations of inlets.	☐Mark all inlets with the words "No Dumping! Flows to Bay" or similar.	☐Maintain and periodically repaint or replace inlet markings. ☐Provide stormwater pollution prevention information to new site owners, lessees, or operators. ☐See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ☐Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
☐**B.** Interior floor drains and elevator shaft sump pumps		☐State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	☐Inspect and maintain drains to prevent blockages and overflow.
☐**C.** Interior parking garages		☐State that parking garage floor drains will be plumbed to the sanitary sewer.	☐Inspect and maintain drains to prevent blockages and overflow.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Source Control Exhibit, Attachment B**	3 **Permanent Controls—List in SUSMP Table and Narrative**	4 **Operational BMPs—Include in SUSMP Table and Narrative**
☐**D1.** Need for future indoor & structural pest control		☐Note building design features that discourage entry of pests.	☐Provide Integrated Pest Management information to owners, lessees, and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
☒**D2.** Landscape/ Outdoor Pesticide Use Note: Should be consistent with project landscape plan (if applicable).	☒Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. ☐Show self-retaining landscape areas, if any. ☒Show stormwater treatment facilities.	State that final landscape plans will accomplish all of the following: ☒Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ☒Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. ☒Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ☒Consider using pest-resistant plants, especially adjacent to hardscape. ☒To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☒Maintain landscaping using minimum or no pesticides. ☐See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ☒Provide IPM information to new owners, lessees and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Source Control Exhibit, Attachment B**	3 **Permanent Controls—List in SUSMP Table and Narrative**	4 **Operational BMPs—Include in SUSMP Table and Narrative**
☐**E.** Pools, spas, ponds, decorative fountains, and other water features.	☐Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet.	☐If the local municipality requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	☐See applicable operational BMPs in Fact Sheet SC-72, "Fountain and Pool Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
☐**F.** Food service	☐For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ☐On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	☐Describe the location and features of the designated cleaning area. ☐Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	☐

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on Source Control Exhibit, Attachment B**	**3** **Permanent Controls—List in SUSMP Table and Narrative**	**4** **Operational BMPs—Include in SUSMP Table and Narrative**
☒G. Refuse areas	☒Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. ☒If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area. ☐Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	☒State how site refuse will be handled and provide supporting detail to what is shown on plans. ☐State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	☒State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
☐H. Industrial processes.	☐Show process area.	☐If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	☐See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE CONTROL BMPs		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on Source Control Exhibit, Attachment B**	3 **Permanent Controls—List in SUSMP Table and Narrative**	4 **Operational BMPs—Include in SUSMP Table and Narrative**
☐I. Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	☐Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area. ☐Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ☐Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	☐Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of local Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release (CalARP) ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank	☐See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

☐**J.** Vehicle and Equipment Cleaning	☐Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle /equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	☐If a car wash area is not provided, describe measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ☐Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. ☐Car dealerships and similar may rinse cars with water only. ☐See Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

☐**K.** Vehicle/Equipment Repair and Maintenance	☐Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater. ☐Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ☐Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	☐State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ☐State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ☐State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the SUSMP report, note that all of the following restrictions apply to use the site: ☐No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ☐No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ☐No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.

☐**L. Fuel Dispensing Areas**	☐Fueling areas[1] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable. ☐Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.		☐The property owner shall dry sweep the fueling area routinely. ☐See the Business Guide Sheet, "Automotive Service—Service Stations" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

[1] The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

☐**M.** Loading Docks	☐Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas should be drained to the sanitary sewer where feasible. Direct connections to storm drains from depressed loading docks are prohibited. ☐Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ☐Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		☐Move loaded and unloaded items indoors as soon as possible. ☐See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
☐**N.** Fire Sprinkler Test Water		☐Provide a means to drain fire sprinkler test water to the sanitary sewer.	☐See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

O. Miscellaneous Drain or Wash Water ☐Boiler drain lines ☐Condensate drain lines ☐Rooftop equipment ☐Drainage sumps ☐Roofing, gutters, and trim.		☐Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ☐Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ☐Rooftop mounted equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ☐Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. ☐Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	
☐**P.** Plazas, sidewalks, and parking lots.			☐Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Washwater containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

STEP 7

LID AND TREATMENT CONTROL SELECTION

A treatment control BMP and/or LID facility must be selected to treat the project pollutants of concern identified in Table 7 "Project Pollutants of Concern". A treatment control facility with a high or medium pollutant removal efficiency for the project's most significant pollutant of concern shall be selected. It is recommended to use the design procedure in Chapter 4 of the SUSMP to meet NPDES permit LID requirements, treatment requirements, and flow control requirements. If your project does not utilize this approach, the project will need to demonstrate compliance with LID, treatment and flow control requirements. Review Chapter 2 "Selection of Stormwater Treatment Facilities" in the SUSMP to assist in determining the appropriate treatment facility for your project.

Will this project be utilizing the unified LID design procedure as described in Chapter 4 of the Local SUSMP? *(If yes, please document in Attachment D following the steps in Chapter 4 of the County SUSMP)*	
☒Yes	☐No
If this project is not utilizing the unified LID design procedure, please describe how the alternative treatment facilities will comply with applicable LID criteria, stormwater treatment criteria, and hydromodification management criteria.	

➢ Indicate the project pollutants of concern (POCs) from Table 7 in Column 2 below.

TABLE 10: GROUPING OF POTENTIAL POLLUTANTS OF CONCERN (POCs) by fate during stormwater treatment

Pollutant	Check Project Specific POCs	Coarse Sediment and Trash	Pollutants that tend to associate with fine particles during treatment	Pollutants that tend to be dissolved following treatment
Sediment	X	X	X	
Nutrients	X		X	X
Heavy Metals	X		X	
Organic Compounds			X	
Trash & Debris		X		
Oxygen Demanding			X	
Bacteria	X		X	
Oil & Grease			X	
Pesticides			X	

➢ Indicate the treatment facility(s) chosen for this project in the following table.

TABLE 11: GROUPS OF POLLUTANTS and relative effectiveness of treatment Facilities

Pollutants of Concern	Bioretention Facilities (LID)	Settling Basins (Dry Ponds)	Wet Ponds and Constructed Wetlands	Infiltration Facilities or Practices (LID)	Media Filters	Higher-rate biofilters*	Higher-rate media filters	Trash Racks & Hydro - dynamic Devices	Vegetated Swales
Coarse Sediment and Trash	High	High	High	High	High	High	High	High	High
Pollutants that tend to associate with fine particles during treatment	High	High	High	High	High	Medium	Medium	Low	Medium
Pollutants that tend to be dissolved following treatment	Medium	Low	Medium	High	Low	Low	Low	Low	Low

➢ Please check the box(s) that best describes the Treatment BMP(s) and/or LID BMP selected for this project.

TABLE 12: PROJECT LID AND TC-BMPS

Bioretention Facilites (LID)
☐Bioretention area
☒Flow-through Planter
☐Cistern with Bioretention Facility
Settling Basins (Dry Ponds)
☐Extended/dry detention basin with grass/vegetated lining
☐Extended/dry detention basin with impervious lining
Infiltration Facilities or Practices (LID)
☐Infiltration basin
☐Dry well
☐Infiltration trench
Wet Ponds and Constructed Wetlands
☐Wet pond/basin (permanent pool)
☐Constructed wetland
Vegetated Swales (LID[(1)])
☒Vegetated Swale

Media Filters
☐Austin Sand Filter
☐Delaware Sand Filter
☐Multi-Chambered Treatment Train (MCTT)
Higher-rate Biofilters
☐Tree-pit-style unit
☐Other_____
Higher-rate Media Filters
☐Vault-based filtration unit with replaceable cartridges
☐Other_____
Hydrodynamic Separator Systems
☐Swirl Concentrator
☐Cyclone Separator
Trash Racks
☐Catch Basin Insert
☐Catch Basin Insert w/ Hydrocarbon boom
☐Other_____
Self-Treating or Self-Retaining Areas (LID)
☐Pervious Pavements
☐Vegetated Roofs
☒Other: Pervious Surfacing (DG)

[1] Must be designed per SUSMP "Vegetated Swales" design criteria for LID credit (p. 65).

For design guidelines and calculations refer to Chapter 4 "Low Impact Development Design Guide" in the SUSMP. Please show all calculations and design sheets for all treatment facilities proposed in Attachment D.

➢ Create a Construction Plan SWMP Checklist for your project.

Instructions on how to fill out table

1) Number and list each measure or BMP you have specified in your SWMP in Columns 1 and Maintenance Category in Column 3 of the table. Leave Column 2 blank.

2) When you submit construction plans, duplicate the table (by photocopy or electronically). Now fill in Column 2, identifying the plan sheets where the BMPs are shown. List all plan sheets on which the BMP appears. This table must be shown on the front sheet of the grading and improvement plans.

Stormwater Treatment Control and LID BMP's			
Description / Type *	Sheet	Maintenance Category	Revisions
1. – Flow Through Planter		One	
2. – Vegetated Swale		One	
3. – Pervious Surfacing		One	

* BMP's approved as part of Stormwater Management Plan (SWMP) dated xx/xx/xx on file with DPW. changes to the above BMP's will require SWMP revision and Plan Change approvals.

➢ Please describe why the chosen treatment BMP(s) was selected for this project. For projects utilizing a low performing BMP, please provide a feasibility analysis that demonstrates utilization of a treatment facility with a high or medium removal efficiency ranking is infeasible.

The Selected Treatment BMP for this project is the vegetated swale that will take runoff from the private road and driveway at the A.C. spillway at Station 5 + 75. The Design Guidelines for this BMP is included in Attachment D as TC-30, Vegetated Swale.

The width of the bio swale on the east side of the Private Road and driveway is 15.00 ft wide. This bio swale flows north at slopes varying from 0.6% to 3.2% from Sta. 2+00 to Sta. 4+01 (201 ft.) where it discharges into a Type "F" catch basin. The other bio swale which is an extension of the previously mentioned swale, flows south at slopes varying from 0.7% to 2.4% from Sta. 5+50 to Sta. 4+01 (149 ft.) where it discharges into the same Type "F" catch basin. Runoff from the Private Road and driveway will be treated by this proposed bio-swale. The typical section has been revised to sow curb opening locations every 25 ft. along the bio swale.

The private roadway has an adjacent trail with a pervious surface.

Landscaped areas adjacent to structures, drives and walkways accept run-off from impervious surfaces is considered as flow through planters due to the natural permeability of native soils.

A Treatment BMP must address runoff from developed areas. Please provide the post-construction water quality treatment volume or flow values for the selected project Treatment BMP(s). Guidelines for design calculations are located in Chapter 4 of the County SUSMP. Label outfalls on the BMP map. The Water Quality peak rate of discharge flow (Q_{WQ}) and the Water Quality storage volume (V_{WQ}) is dependent on the type of treatment BMP selected for the project.

Outfall	**Tributary Area (acres)**	**Q_{WQ} (cfs)**	**V_{WQ} (ft^3)**
AC Spillway @ Sta. 5+75	0.48	2.6	2.6

STEP 8

OPERATION AND MAINTENANCE

➢ Please check the box that best describes the maintenance mechanism(s) for this project.

TABLE 13: PROJECT BMP CATEGORY

CATEGORY	SELECTED		BMP Description
	YES	NO	
First	☒	☐	Vegetated Swale, Flow Through Planter, Pervious Surfacing
Second[1]	☐	☒	
Third[2]	☐	☒	
Fourth	☐	☒	

Note:

(1) A recorded maintenance agreement will be required.

(2) Project will be required to establish or be included in a Stormwater Maintenance Assessment District for the long-term maintenance of treatment BMPs.

➢ Please list all individual LID and Treatment Control BMPs (TC-BMPs) incorporated into project. Please ensure the "BMP Identifier" is consistent with the legend in Attachment C "LID and/or TC-BMP Exhibit". Please attach the record plan sheets upon completion of project and amend the Major SWMP where appropriate. For each type of LID or TC-BMP provide an inspection sheet in Attachment F "Maintenance Plan".

TABLE 14: PROJECT SPECIFIC LID AND TC-BMPS

BMP Identifier*	LID or TC-BMP Type	BMP Pollutant of Concern Efficiency (H,M,L) – Table 11	Final Construction Date *(to be completed by County inspector)*	Final Construction Inspector Name *(to be completed by County inspector)*
1	Flow Through Planter			
2	Vegetated Swale			
3	Pervious Surfacing			
4	Trash Storage			
5	Efficient Irrigation			

* For location of BMP's, see approved Record Plan dated ___/___/_____, plan type _____ sheet __ of __.

➢ Responsible Party for Long-term Maintenance:

Identify the parties responsible for long-term maintenance of the BMPs identified above and Source Controls specified in Attachment B. Include the appropriate written agreement with the entities responsible for O&M in Attachment F. Please see Chapter 5 "Private Ownership and Maintenance" on page 94 of the County SUSMP for appropriate maintenance mechanisms.

Name: Tim and Christine Neumann, Trustees
Company Name: Neumann Family Trust
Phone Number: (760) 458-9127
Street Address: 1191 North Ridgeline Drive
City/State/Zip: Orange, California 92869
Email Address: -N/A-

➢ Funding Source:

Provide the funding source or sources for long-term operation and maintenance of each BMP identified above. By certifying the Major SWMP the applicant is certifying that the funding responsibilities have been addressed and will be transferred to future owners.

Permanent Maintenance is by Current Property Owner and Subsequent Owner(s). The owner(s) are fiscally responsible for providing ongoing maintenance. There is no funding requirement for the County to provide maintenance and assurance of maintenance by either /or Stormwater Ordinance Requirement:, Public Nuisance Abatement,. Notice to Purchasers, Conditions in Ongoing Land Use Permits or Subdivision Public Report.
A Private Road Maintenance Agreement is used for maintenance of BMPs along the private roadway and funded by adjacent owner(s). No funding requirement for the County except the assurances listed above.

ATTACHMENTS

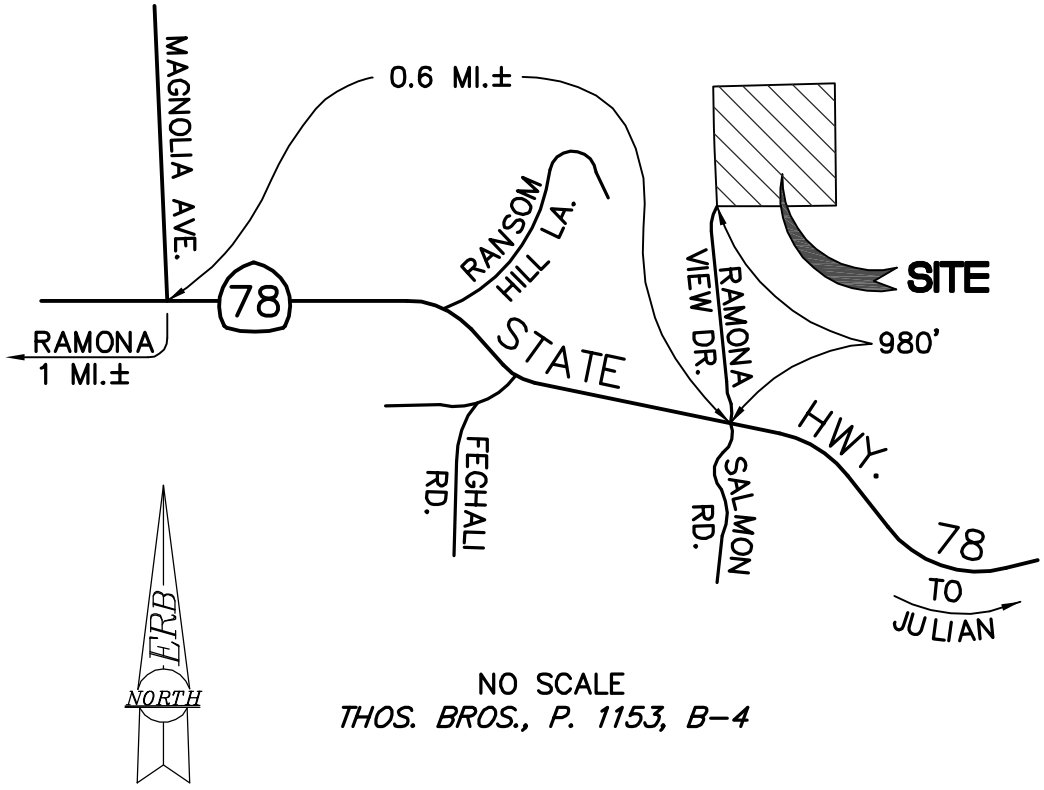
Please include the following attachments.

	ATTACHMENT	COMPLETED	N/A
A	Project Location Map	☐	☐
B	Source Control Exhibit	☐	☐
C	LID and/or TC-BMP Exhibit	☐	☐
D	Drainage Management Area (DMA) Maps, Sizing Design Calculations and BMP/IMP Design Details	☐	☐
E	Geotechnical Certification Sheet	☐	☒
F	Maintenance Plan	☐	☐
G	Tracking Report	☐	☐
H	Addendum	☐	☐

Note: Attachments B and C may be combined.

ATTACHMENT A

Project Location Map



NO SCALE

THOS. BROS., P. 1153, B–4

OTHER SOURCE CONTROL BMP's

- Preserve existing native trees and ground cover.
- Landscape design minimizes irrigation and runoff, promotes surface infiltration where appropriate and minimizes the use of fertilizers and pesticides.
- Maintain landscaping using minimum or no pesticides.
- Select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency and plant interactions.

PARCEL 4

SILT FENCE

GRAVEL BAGS (2 LAYER HIGH) TYP.

PARCEL 3

SILT FENCE

MTLS. DEL. & STORAGE

CS

VEM

VEC

VEF

SS

SWM

CWM

PARCEL 1

SILT FENCE

STABILIZED CONST. ENTRANCE (TC-1)

EXIST. PAVEMENT

PARCEL 2

BMP LEGEND

- 2 LAYERS WASHED GRAVEL BAGS *DETAIL #SC-8 & #SC-6
- SILT FENCE *DETAIL # SC-1
- STABILIZED CONSTRUCTION ENTRANCE/EXIT AREA TO BE COVERED WITH CRUSHED AGGREGATE *DETAIL # TC-1
- SS — SANITARY WASTE *DETAIL # WM-9
- MTLS. DEL. & STORAGE — MATERIALS DELIVERY & STORAGE *DETAIL # WM-1

*DETAILS PER CALTRANS STORMWATER QUALITY HANDBOOK CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL

ERB

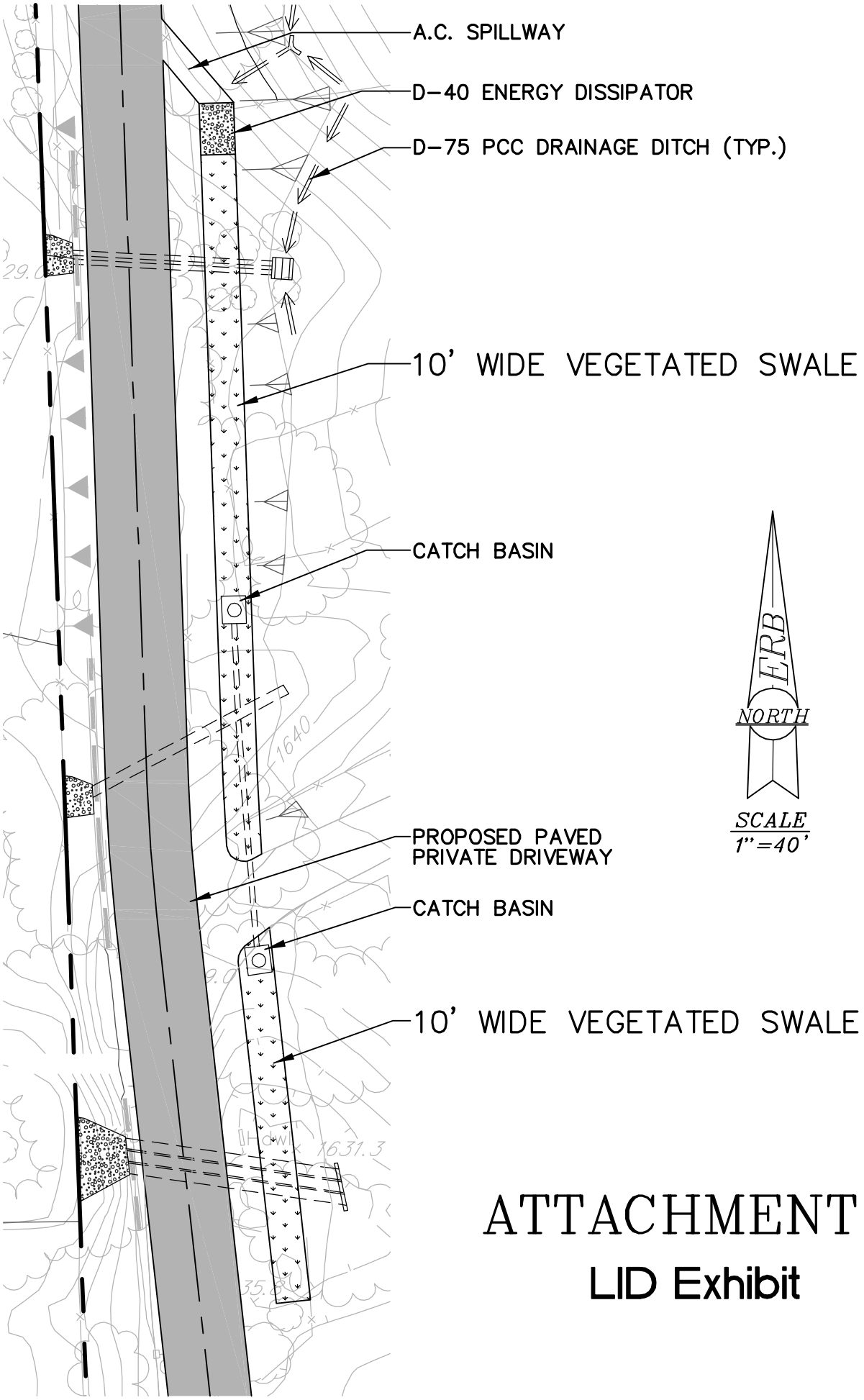
NORTH

NO SCALE

- SWM — SOLID WASTE MANAGEMENT *DETAIL # WM-5
- CWM — CONCRETE WASTE MANAGEMENT *DETAIL WM-8
- CS — STOCKPILE MANAGEMENT *DETAIL WM-3
- VEC — VEHICLE AND EQUIPMENT CLEANING *DETAIL NS-8
- VEF — VEHICLE AND EQUIPMENT FUELING *DETAIL NS-9
- VEM — VEHICLE AND EQUIPMENT MAINTENANCE *DETAIL NS-10

ATTACHMENT B

Source Control Exhibit



ATTACHMENT C

LID Exhibit

C. Little
2/22/07

Calculate Runoff from Driveway

A = 0.48 acres impervious

$P_{6\,100}$ = 3.3 inches

C = 0.90

L = 1690 − 570 = 1120′ Avg. Slope = 14.99%

Δe = 1803 − 1636 = 167 ft. elev. Δ

$T = T_i + T_t$

Use Table 3-2 SDCHM June 2007

MDR = 1 10% T_i = 6.4 min.

L_i = 100

T_t = travel time in curb + gutter

Assume Q = 3.4 cfs

From Fig. 3-6 See attached V = 7.8 fps

$$T_t = \frac{1120'}{7.8\,fps} \cdot \frac{1\,min.}{60\,sec} = 2.4\ min.$$

$T = T_i + T_t$ = 6.4 min + 2.4 min. = 8.8 min.

$$I = 7.44\,(3.3)^{-0.645}\,8.8^{-0.645}$$

= 6.0 in/hr.

$Q_{100} = C\,I\,A = 0.90\,(6.0)(0.48)$

= 2.6 cfs

CROSS SECTIONAL CAPACITY OF VEGETATED SWALE

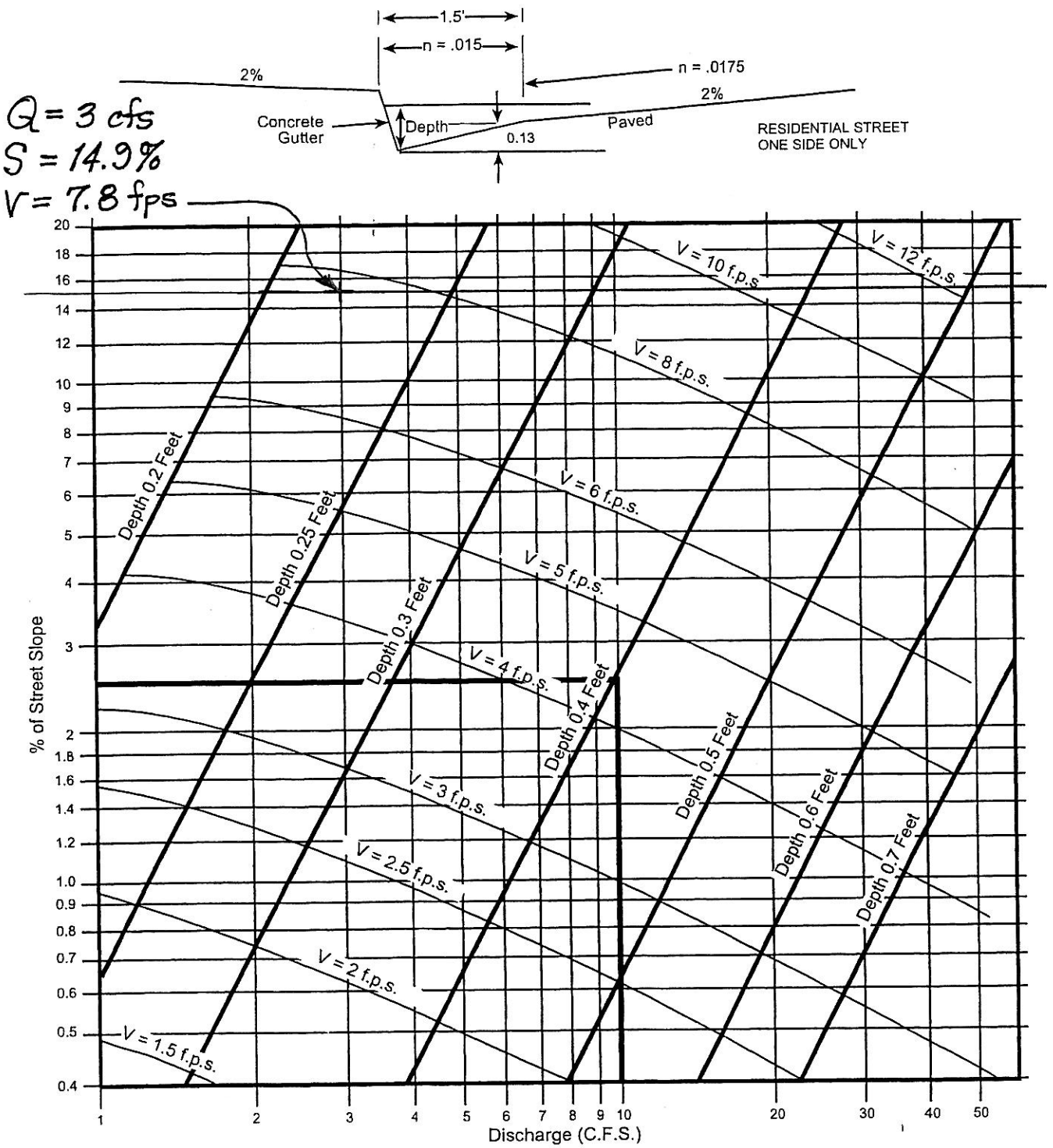
Manning's formula:

$Q = 1.486/n \times A \times R^{(2/3)} \times S^{(1/2)}$

Where:

$A = (bb+zy)y$
$P = b + 2(y^2+y^2 \times z^2) \times .5$
$R = A/P$

BOTTOM WIDTH	b	10.00
DEPTH	y	0.60
SIDE SLOPES	z	2.00
SLOPE	s	0.01
MANNINGS #	n	0.25
CROSS SECTIONAL AREA	A	6.72
WETTED PERIMETER	P	13.60
HYDRAULIC RADIUS	R	0.49
CAPACITY (CFS)	Q	2.09



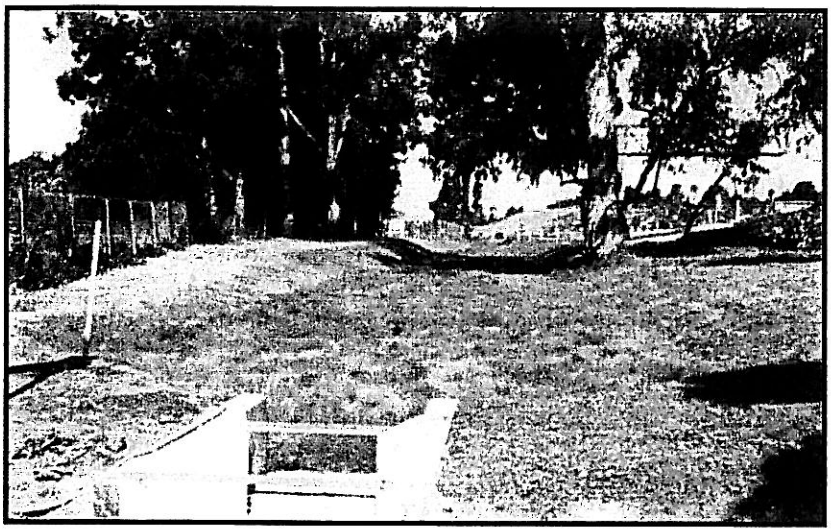
EXAMPLE:
Given: Q = 10 S = 2.5%
Chart gives: Depth = 0.4, Velocity = 4.4 f.p.s.

SOURCE: San Diego County Department of Special District Services Design Manual

Gutter and Roadway Discharge - Velocity Chart

FIGURE 3-6

Vegetated Swale TC-30



Design Considerations

- Tributary Area
- Area Required
- Slope
- Water Availability

Description

Vegetated swales are open, shallow channels with vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream discharge points. They are designed to treat runoff through filtering by the vegetation in the channel, filtering through a subsoil matrix, and/or infiltration into the underlying soils. Swales can be natural or manmade. They trap particulate pollutants (suspended solids and trace metals), promote infiltration, and reduce the flow velocity of stormwater runoff. Vegetated swales can serve as part of a stormwater drainage system and can replace curbs, gutters and storm sewer systems.

Targeted Constituents

✓	Sediment	▲
✓	Nutrients	●
✓	Trash	●
✓	Metals	▲
✓	Bacteria	●
✓	Oil and Grease	▲
✓	Organics	▲

Legend *(Removal Effectiveness)*

● Low ■ High

▲ Medium

California Experience

Caltrans constructed and monitored six vegetated swales in southern California. These swales were generally effective in reducing the volume and mass of pollutants in runoff. Even in the areas where the annual rainfall was only about 10 inches/yr, the vegetation did not require additional irrigation. One factor that strongly affected performance was the presence of large numbers of gophers at most of the sites. The gophers created earthen mounds, destroyed vegetation, and generally reduced the effectiveness of the controls for TSS reduction.

Advantages

- If properly designed, vegetated, and operated, swales can serve as an aesthetic, potentially inexpensive urban development or roadway drainage conveyance measure with significant collateral water quality benefits.

CASQA California Stormwater Quality Association

- Roadside ditches should be regarded as significant potential swale/buffer strip sites and should be utilized for this purpose whenever possible.

Limitations

- Can be difficult to avoid channelization.
- May not be appropriate for industrial sites or locations where spills may occur
- Grassed swales cannot treat a very large drainage area. Large areas may be divided and treated using multiple swales.
- A thick vegetative cover is needed for these practices to function properly.
- They are impractical in areas with steep topography.
- They are not effective and may even erode when flow velocities are high, if the grass cover is not properly maintained.
- In some places, their use is restricted by law: many local municipalities require curb and gutter systems in residential areas.
- Swales are mores susceptible to failure if not properly maintained than other treatment BMPs.

Design and Sizing Guidelines

- Flow rate based design determined by local requirements or sized so that 85% of the annual runoff volume is discharged at less than the design rainfall intensity.
- Swale should be designed so that the water level does not exceed 2/3rds the height of the grass or 4 inches, which ever is less, at the design treatment rate.
- Longitudinal slopes should not exceed 2.5%
- Trapezoidal channels are normally recommended but other configurations, such as parabolic, can also provide substantial water quality improvement and may be easier to mow than designs with sharp breaks in slope.
- Swales constructed in cut are preferred, or in fill areas that are far enough from an adjacent slope to minimize the potential for gopher damage. Do not use side slopes constructed of fill, which are prone to structural damage by gophers and other burrowing animals.
- A diverse selection of low growing, plants that thrive under the specific site, climatic, and watering conditions should be specified. Vegetation whose growing season corresponds to the wet season are preferred. Drought tolerant vegetation should be considered especially for swales that are not part of a regularly irrigated landscaped area.
- The width of the swale should be determined using Manning's Equation using a value of 0.25 for Manning's n.

Construction/Inspection Considerations

- Include directions in the specifications for use of appropriate fertilizer and soil amendments based on soil properties determined through testing and compared to the needs of the vegetation requirements.
- Install swales at the time of the year when there is a reasonable chance of successful establishment without irrigation; however, it is recognized that rainfall in a given year may not be sufficient and temporary irrigation may be used.
- If sod tiles must be used, they should be placed so that there are no gaps between the tiles; stagger the ends of the tiles to prevent the formation of channels along the swale or strip.
- Use a roller on the sod to ensure that no air pockets form between the sod and the soil.
- Where seeds are used, erosion controls will be necessary to protect seeds for at least 75 days after the first rainfall of the season.

Performance

The literature suggests that vegetated swales represent a practical and potentially effective technique for controlling urban runoff quality. While limited quantitative performance data exists for vegetated swales, it is known that check dams, slight slopes, permeable soils, dense grass cover, increased contact time, and small storm events all contribute to successful pollutant removal by the swale system. Factors decreasing the effectiveness of swales include compacted soils, short runoff contact time, large storm events, frozen ground, short grass heights, steep slopes, and high runoff velocities and discharge rates.

Conventional vegetated swale designs have achieved mixed results in removing particulate pollutants. A study performed by the Nationwide Urban Runoff Program (NURP) monitored three grass swales in the Washington, D.C., area and found no significant improvement in urban runoff quality for the pollutants analyzed. However, the weak performance of these swales was attributed to the high flow velocities in the swales, soil compaction, steep slopes, and short grass height.

Another project in Durham, NC, monitored the performance of a carefully designed artificial swale that received runoff from a commercial parking lot. The project tracked 11 storms and concluded that particulate concentrations of heavy metals (Cu, Pb, Zn, and Cd) were reduced by approximately 50 percent. However, the swale proved largely ineffective for removing soluble nutrients.

The effectiveness of vegetated swales can be enhanced by adding check dams at approximately 17 meter (50 foot) increments along their length (See Figure 1). These dams maximize the retention time within the swale, decrease flow velocities, and promote particulate settling. Finally, the incorporation of vegetated filter strips parallel to the top of the channel banks can help to treat sheet flows entering the swale.

Only 9 studies have been conducted on all grassed channels designed for water quality (Table 1). The data suggest relatively high removal rates for some pollutants, but negative removals for some bacteria, and fair performance for phosphorus.

Table 1 Grassed swale pollutant removal efficiency data							
	Removal Efficiencies (% Removal)						
Study	TSS	TP	TN	NO_3	Metals	Bacteria	Type
Caltrans 2002	77	8	67	66	83-90	-33	dry swales
Goldberg 1993	67.8	4.5	-	31.4	42–62	-100	grassed channel
Seattle Metro and Washington Department of Ecology 1992	60	45	-	-25	2–16	-25	grassed channel
Seattle Metro and Washington Department of Ecology, 1992	83	29	-	-25	46–73	-25	grassed channel
Wang et al., 1981	80	-	-	-	70–80	-	dry swale
Dorman et al., 1989	98	18	-	45	37–81	-	dry swale
Harper, 1988	87	83	84	80	88–90	-	dry swale
Kercher et al., 1983	99	99	99	99	99	-	dry swale
Harper, 1988.	81	17	40	52	37–69	-	wet swale
Koon, 1995	67	39	-	9	-35 to 6	-	wet swale

While it is difficult to distinguish between different designs based on the small amount of available data, grassed channels generally have poorer removal rates than wet and dry swales, although some swales appear to export soluble phosphorus (Harper, 1988; Koon, 1995). It is not clear why swales export bacteria. One explanation is that bacteria thrive in the warm swale soils.

Siting Criteria

The suitability of a swale at a site will depend on land use, size of the area serviced, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the swale system (Schueler et al., 1992). In general, swales can be used to serve areas of less than 10 acres, with slopes no greater than 5 %. Use of natural topographic lows is encouraged and natural drainage courses should be regarded as significant local resources to be kept in use (Young et al., 1996).

Selection Criteria (NCTCOG, 1993)

- Comparable performance to wet basins
- Limited to treating a few acres
- Availability of water during dry periods to maintain vegetation
- Sufficient available land area

Research in the Austin area indicates that vegetated controls are effective at removing pollutants even when dormant. Therefore, irrigation is not required to maintain growth during dry periods, but may be necessary only to prevent the vegetation from dying.

The topography of the site should permit the design of a channel with appropriate slope and cross-sectional area. Site topography may also dictate a need for additional structural controls. Recommendations for longitudinal slopes range between 2 and 6 percent. Flatter slopes can be used, if sufficient to provide adequate conveyance. Steep slopes increase flow velocity, decrease detention time, and may require energy dissipating and grade check. Steep slopes also can be managed using a series of check dams to terrace the swale and reduce the slope to within acceptable limits. The use of check dams with swales also promotes infiltration.

Additional Design Guidelines

Most of the design guidelines adopted for swale design specify a minimum hydraulic residence time of 9 minutes. This criterion is based on the results of a single study conducted in Seattle, Washington (Seattle Metro and Washington Department of Ecology, 1992), and is not well supported. Analysis of the data collected in that study indicates that pollutant removal at a residence time of 5 minutes was not significantly different, although there is more variability in that data. Therefore, additional research in the design criteria for swales is needed. Substantial pollutant removal has also been observed for vegetated controls designed solely for conveyance (Barrett et al, 1998); consequently, some flexibility in the design is warranted.

Many design guidelines recommend that grass be frequently mowed to maintain dense coverage near the ground surface. Recent research (Colwell et al., 2000) has shown mowing frequency or grass height has little or no effect on pollutant removal.

Summary of Design Recommendations

1) The swale should have a length that provides a minimum hydraulic residence time of at least 10 minutes. The maximum bottom width should not exceed 10 feet unless a dividing berm is provided. The depth of flow should not exceed 2/3rds the height of the grass at the peak of the water quality design storm intensity. The channel slope should not exceed 2.5%.

2) A design grass height of 6 inches is recommended.

3) Regardless of the recommended detention time, the swale should be not less than 100 feet in length.

4) The width of the swale should be determined using Manning's Equation, at the peak of the design storm, using a Manning's n of 0.25.

5) The swale can be sized as both a treatment facility for the design storm and as a conveyance system to pass the peak hydraulic flows of the 100-year storm if it is located "on-line." The side slopes should be no steeper than 3:1 (H:V).

6) Roadside ditches should be regarded as significant potential swale/buffer strip sites and should be utilized for this purpose whenever possible. If flow is to be introduced through curb cuts, place pavement slightly above the elevation of the vegetated areas. Curb cuts should be at least 12 inches wide to prevent clogging.

7) Swales must be vegetated in order to provide adequate treatment of runoff. It is important to maximize water contact with vegetation and the soil surface. For general purposes, select fine, close-growing, water-resistant grasses. If possible, divert runoff (other than necessary irrigation) during the period of vegetation

establishment. Where runoff diversion is not possible, cover graded and seeded areas with suitable erosion control materials.

Maintenance

The useful life of a vegetated swale system is directly proportional to its maintenance frequency. If properly designed and regularly maintained, vegetated swales can last indefinitely. The maintenance objectives for vegetated swale systems include keeping up the hydraulic and removal efficiency of the channel and maintaining a dense, healthy grass cover.

Maintenance activities should include periodic mowing (with grass never cut shorter than the design flow depth), weed control, watering during drought conditions, reseeding of bare areas, and clearing of debris and blockages. Cuttings should be removed from the channel and disposed in a local composting facility. Accumulated sediment should also be removed manually to avoid concentrated flows in the swale. The application of fertilizers and pesticides should be minimal.

Another aspect of a good maintenance plan is repairing damaged areas within a channel. For example, if the channel develops ruts or holes, it should be repaired utilizing a suitable soil that is properly tamped and seeded. The grass cover should be thick; if it is not, reseed as necessary. Any standing water removed during the maintenance operation must be disposed to a sanitary sewer at an approved discharge location. Residuals (e.g., silt, grass cuttings) must be disposed in accordance with local or State requirements. Maintenance of grassed swales mostly involves maintenance of the grass or wetland plant cover. Typical maintenance activities are summarized below:

- Inspect swales at least twice annually for erosion, damage to vegetation, and sediment and debris accumulation preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the swale is ready for winter. However, additional inspection after periods of heavy runoff is desirable. The swale should be checked for debris and litter, and areas of sediment accumulation.

- Grass height and mowing frequency may not have a large impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.

- Trash tends to accumulate in swale areas, particularly along highways. The need for litter removal is determined through periodic inspection, but litter should always be removed prior to mowing.

- Sediment accumulating near culverts and in channels should be removed when it builds up to 75 mm (3 in.) at any spot, or covers vegetation.

- Regularly inspect swales for pools of standing water. Swales can become a nuisance due to mosquito breeding in standing water if obstructions develop (e.g. debris accumulation, invasive vegetation) and/or if proper drainage slopes are not implemented and maintained.

Cost

Construction Cost

Little data is available to estimate the difference in cost between various swale designs. One study (SWRPC, 1991) estimated the construction cost of grassed channels at approximately $0.25 per ft². This price does not include design costs or contingencies. Brown and Schueler (1997) estimate these costs at approximately 32 percent of construction costs for most stormwater management practices. For swales, however, these costs would probably be significantly higher since the construction costs are so low compared with other practices. A more realistic estimate would be a total cost of approximately $0.50 per ft², which compares favorably with other stormwater management practices.

Table 2 Swale Cost Estimate (SEWRPC, 1991)

Component	Unit	Extent	Unit Cost			Total Cost		
			Low	Moderate	High	Low	Moderate	High
Mobilization / Demobilization-Light	Swale	1	$107	$274	$441	$107	$274	$441
Site Preparation								
Clearing[b]	Acre	0.5	$2,200	$3,800	$5,400	$1,100	$1,900	$2,700
Grubbing[c]	Acre	0.25	$3,800	$5,200	$6,600	$950	$1,300	$1,650
General Excavation[d]	Yd^3	372	$2.10	$3.70	$5.30	$781	$1,376	$1,972
Level and Till[e]	Yd^2	1,210	$0.20	$0.35	$0.50	$242	$424	$605
Sites Development								
Salvaged Topsoil	Yd^2	1,210	$0.40	$1.00	$1.60	$484	$1,210	$1,936
Seed, and Mulch[f]	Yd^2	1,210	$1.20	$2.40	$3.60	$1,452	$2,904	$4,356
Sod[g]								
Subtotal	--	--	--	--	--	$5,116	$9,388	$13,660
Contingencies	Swale	1	25%	25%	25%	$1,279	$2,347	$3,415
Total	--	--	--	--	--	$6,395	$11,735	$17,075

Source: (SEWRPC, 1991)

Note: Mobilization/demobilization refers to the organization and planning involved in establishing a vegetative swale.

[a] Swale has a bottom width of 1.0 foot, a top width of 10 feet with 1:3 side slopes, and a 1,000-foot length.

[b] Area cleared = (top width + 10 feet) x swale length.

[c] Area grubbed = (top width x swale length).

[d] Volume excavated = (0.67 x top width x swale depth) x swale length (parabolic cross-section).

[e] Area tilled = $\left(\text{top width} + \frac{8(\text{swale depth}^2)}{3(\text{top width})}\right) \times$ swale length (parabolic cross-section).

[f] Area seeded = area cleared x 0.5.

[g] Area sodded = area cleared x 0.5.

Table 3 Estimated Maintenance Costs (SEWRPC, 1991)

Component	Unit Cost	Swale Size (Depth and Top Width)		Comment
		1.5 Foot Depth, One-Foot Bottom Width, 10-Foot Top Width	3-Foot Depth, 3-Foot Bottom Width, 21-Foot Top Width	
Lawn Mowing	$0.85 / 1,000 ft²/ mowing	$0.14 / linear foot	$0.21 / linear foot	Lawn maintenance area=(top width + 10 feet) x length. Mow eight times per year
General Lawn Care	$9.00 / 1,000 ft²/ year	$0.18 / linear foot	$0.28 / linear foot	Lawn maintenance area = (top width + 10 feet) x length
Swale Debris and Litter Removal	$0.10 / linear foot / year	$0.10 / linear foot	$0.10 / linear foot	–
Grass Reseeding with Mulch and Fertilizer	$0.30 / yd²	$0.01 / linear foot	$0.01 / linear foot	Area revegetated equals 1% of lawn maintenance area per year
Program Administration and Swale Inspection	$0.15 / linear foot / year, plus $25 / inspection	$0.15 / linear foot	$0.15 / linear foot	Inspect four times per year
Total	--	**$0.58 / linear foot**	**$ 0.75 / linear foot**	–

Maintenance Cost

Caltrans (2002) estimated the expected annual maintenance cost for a swale with a tributary area of approximately 2 ha at approximately $2,700. Since almost all maintenance consists of mowing, the cost is fundamentally a function of the mowing frequency. Unit costs developed by SEWRPC are shown in Table 3. In many cases vegetated channels would be used to convey runoff and would require periodic mowing as well, so there may be little additional cost for the water quality component. Since essentially all the activities are related to vegetation management, no special training is required for maintenance personnel.

References and Sources of Additional Information

Barrett, Michael E., Walsh, Patrick M., Malina, Joseph F., Jr., Charbeneau, Randall J, 1998, "Performance of vegetative controls for treating highway runoff," *ASCE Journal of Environmental Engineering*, Vol. 124, No. 11, pp. 1121-1128.

Brown, W., and T. Schueler. 1997. *The Economics of Stormwater BMPs in the Mid-Atlantic Region.* Prepared for the Chesapeake Research Consortium, Edgewater, MD, by the Center for Watershed Protection, Ellicott City, MD.

Center for Watershed Protection (CWP). 1996. *Design of Stormwater Filtering Systems.* Prepared for the Chesapeake Research Consortium, Solomons, MD, and USEPA Region V, Chicago, IL, by the Center for Watershed Protection, Ellicott City, MD.

Colwell, Shanti R., Horner, Richard R., and Booth, Derek B., 2000. *Characterization of Performance Predictors and Evaluation of Mowing Practices in Biofiltration Swales.* Report to King County Land And Water Resources Division and others by Center for Urban Water Resources Management, Department of Civil and Environmental Engineering, University of Washington, Seattle, WA

Dorman, M.E., J. Hartigan, R.F. Steg, and T. Quasebarth. 1989. *Retention, Detention and Overland Flow for Pollutant Removal From Highway Stormwater Runoff. Vol. 1.* FHWA/RD 89/202. Federal Highway Administration, Washington, DC.

Goldberg. 1993. *Dayton Avenue Swale Biofiltration Study.* Seattle Engineering Department, Seattle, WA.

Harper, H. 1988. *Effects of Stormwater Management Systems on Groundwater Quality.* Prepared for Florida Department of Environmental Regulation, Tallahassee, FL, by Environmental Research and Design, Inc., Orlando, FL.

Kercher, W.C., J.C. Landon, and R. Massarelli. 1983. Grassy swales prove cost-effective for water pollution control. *Public Works*, 16: 53–55.

Koon, J. 1995. *Evaluation of Water Quality Ponds and Swales in the Issaquah/East Lake Sammamish Basins.* King County Surface Water Management, Seattle, WA, and Washington Department of Ecology, Olympia, WA.

Metzger, M. E., D. F. Messer, C. L. Beitia, C. M. Myers, and V. L. Kramer. 2002. The Dark Side Of Stormwater Runoff Management: Disease Vectors Associated With Structural BMPs. Stormwater 3(2): 24-39.Oakland, P.H. 1983. An evaluation of stormwater pollutant removal

through grassed swale treatment. In *Proceedings of the International Symposium of Urban Hydrology, Hydraulics and Sediment Control, Lexington, KY.* pp. 173–182.

Occoquan Watershed Monitoring Laboratory. 1983. Final Report: *Metropolitan Washington Urban Runoff Project.* Prepared for the Metropolitan Washington Council of Governments, Washington, DC, by the Occoquan Watershed Monitoring Laboratory, Manassas, VA.

Pitt, R., and J. McLean. 1986. *Toronto Area Watershed Management Strategy Study: Humber River Pilot Watershed Project.* Ontario Ministry of Environment, Toronto, ON.

Schueler, T. 1997. Comparative Pollutant Removal Capability of Urban BMPs: A reanalysis. *Watershed Protection Techniques* 2(2):379–383.

Seattle Metro and Washington Department of Ecology. 1992. *Biofiltration Swale Performance: Recommendations and Design Considerations.* Publication No. 657. Water Pollution Control Department, Seattle, WA.

Southeastern Wisconsin Regional Planning Commission (SWRPC). 1991. *Costs of Urban Nonpoint Source Water Pollution Control Measures.* Technical report no. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI.

U.S. EPA, 1999, Stormwater Fact Sheet: Vegetated Swales, Report # 832-F-99-006 http://www.epa.gov/owm/mtb/vegswale.pdf, Office of Water, Washington DC.

Wang, T., D. Spyridakis, B. Mar, and R. Horner. 1981. *Transport, Deposition and Control of Heavy Metals in Highway Runoff.* FHWA-WA-RD-39-10. University of Washington, Department of Civil Engineering, Seattle, WA.

Washington State Department of Transportation, 1995, *Highway Runoff Manual,* Washington State Department of Transportation, Olympia, Washington.

Welborn, C., and J. Veenhuis. 1987. *Effects of Runoff Controls on the Quantity and Quality of Urban Runoff in Two Locations in Austin, TX.* USGS Water Resources Investigations Report No. 87-4004. U.S. Geological Survey, Reston, VA.

Yousef, Y., M. Wanielista, H. Harper, D. Pearce, and R. Tolbert. 1985. *Best Management Practices: Removal of Highway Contaminants By Roadside Swales.* University of Central Florida and Florida Department of Transportation, Orlando, FL.

Yu, S., S. Barnes, and V. Gerde. 1993. *Testing of Best Management Practices for Controlling Highway Runoff.* FHWA/VA-93-R16. Virginia Transportation Research Council, Charlottesville, VA.

Information Resources

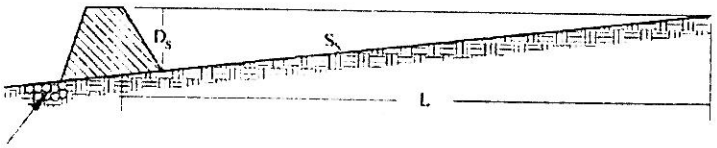
Maryland Department of the Environment (MDE). 2000. *Maryland Stormwater Design Manual.* www.mde.state.md.us/environment/wma/stormwatermanual. Accessed May 22, 2001.

Reeves, E. 1994. Performance and Condition of Biofilters in the Pacific Northwest. *Watershed Protection Techniques* 1(3):117–119.

Seattle Metro and Washington Department of Ecology. 1992. *Biofiltration Swale Performance.* Recommendations and Design Considerations. Publication No. 657. Seattle Metro and Washington Department of Ecology, Olympia, WA.

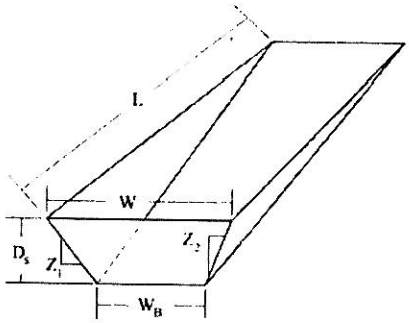
USEPA 1993. *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters.* EPA-840-B-92-002. U.S. Environmental Protection Agency, Office of Water. Washington, DC.

Watershed Management Institute (WMI). 1997. *Operation, Maintenance, and Management of Stormwater Management Systems.* Prepared for U.S. Environmental Protection Agency, Office of Water. Washington, DC, by the Watershed Management Institute, Ingleside, MD.



Provide for scour protection.

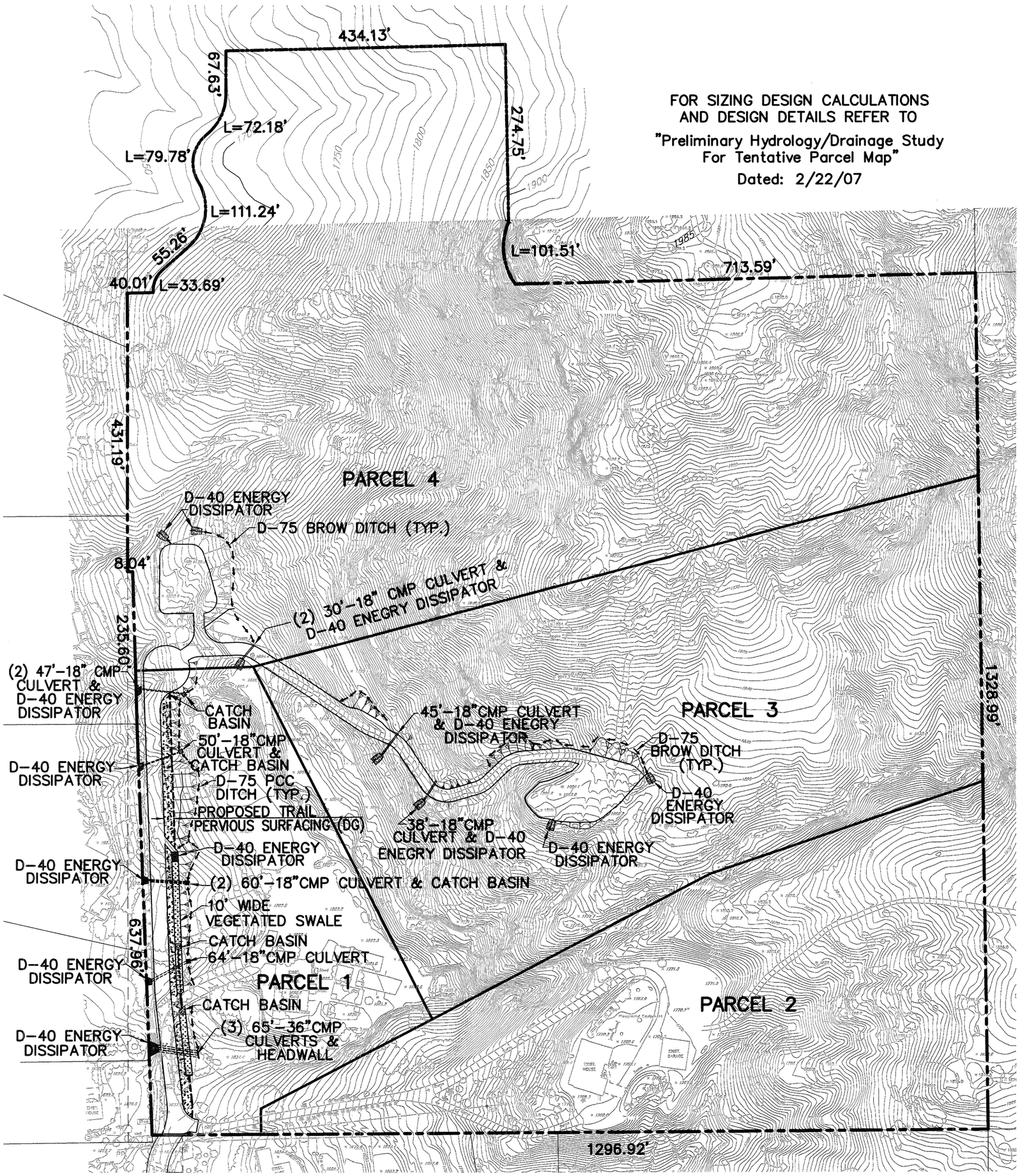
(a) Cross section of swale with check dam.



(b) Dimensional view of swale impoundment area.

Notation:

L = Length of swale impoundment area per check dam (ft)
D_s = Depth of check dam (ft)
S_s = Bottom slpe of swale (ft/ft)
W = Top width of check dam (ft)
W_B = Bottom width of check dam (ft)
$Z_{1&2}$ = Ratio of horizontal to vertical change in swale side slope (ft/ft)



NORTH

NO SCALE

ATTACHMENT D

DRAINAGE MANAGEMENT AREA (DMA) MAP

ATTACHMENT E

Geotechnical Certification Sheet

The design of stormwater treatment and other control measures proposed in this plan requiring specific soil infiltration characteristics and / or geological conditions has been reviewed and approved by a registered Civil Engineer, Geotechnical Engineer or Geologist in the state of California.

Name

6–18–10
Date

ATTACHMENT F

Maintenance Plan

(Use Chapter 5 of the SUSMP as guidance in developing your Maintenance Plan)

I. Inspection and Maintenance Log forms (follow at end of section).
Self-Verification Forms

As there are no Treatment Control BMPs of the type (Biofilters, Detention Basins And Wet Ponds, Drainage Inserts, Filtration, Hydrodynamic Devices, Infiltration Facilities, or Planter Boxes) with Self-Verification Forms outlined in Appendix F of the San Diego County SUSMP), they are not provided.

II. Updates, Revisions and Errata

III. Introduction

The proposed development involves subdividing a 39.6-acre parcel into four separate parcels. Parcels 1 and 2 are currently developed with single family dwellings. The existing and proposed residences are accessed off of a private road called Ramona View Drive. The private road will be extended to Parcel 4. From there driveways will serve Parcels 3 and 4. The extension to Ramona View Drive will be widened to 24 feet and transitioned to 16 feet after connecting to an existing driveway for Parcel 1.

IV. Responsibility for Maintenance

A. General

(1) Responsible Individuals:

Tim and Christine Neumann
1191 North Ridgeline Drive
Orange, California 92869
(760) 458-9127

(2) Organization chart or charts showing organization of the maintenance function and location within the overall organization.

No Organization. Individual Owners.

(3) Reference to Operation and Maintenance Agreement (if any). A copy of the agreement should be attached.

Permanent Maintenance is by Current Property Owner and Subsequent Owner(s).
A Private Road Maintenance Agreement is used for maintenance of BMPs along the private roadway.

(4) Maintenance Funding

The owner(s) are fiscally responsible for providing ongoing maintenance. There is no funding requirement for the County to provide maintenance.
Private Road maintenance is funded by adjacent owner(s) per the Agreement.

(1) Sources of funds for maintenance
Private property owners funds.

(2) Budget category or line item
No budget or line item.

(3) Description of procedure and process for ensuring adequate funding for maintenance
Assurance of maintenance by either /or Stormwater Ordinance Requirement:, Public Nuisance Abatement,. Notice to Purchasers, Conditions in Ongoing Land Use Permits or Subdivision Public Report.

B. Staff Training Program

No Staff for training program

C. Records

Records for inspections and maintenance are to be maintained for five (5) years.

D. Safety

The obligation to provide a safe environment belongs to the property owner(s) of record.

V. Summary of Drainage Areas and Stormwater Facilities

A. Drainage Areas

The proposed project will not significantly alter drainage patterns on the site. Energy dissipaters will be placed at all culvert outlets. Furthermore, there will not be a substantial increase to the amount of impervious area. Approximately 0.3 acres of open ground will be converted to single-family residential pads. Paved driveways will convert approximately another 0.57 acres of impervious surface, thus representing a change of 2.0% to the impervious area of the project site.

The site has several intermittent natural drainage channels that drain areas to the east of the 39.6-acre parcel. One of these natural drainage channels that flows south of existing development for Parcel 1 has an existing culvert beneath the driveway that serves that development. The only other storm drain systems for the existing development for Parcels 1 and 2 consist of localized open systems for each of the developed areas. Both parcels have existing driveways with AC berms that channel runoff to Ramona View Drive where it is discharged into natural drainage channels.

The extension of the private road off of Ramona View Drive will require culverts at several locations. The culverts will be sized to adequately convey the park 100-year flow. A detailed description of the drainage patterns, flows, and culvert sizes are discussed in the Preliminary Hydrology/Drainage Study prepared for this project by ERB ENGINEERING, INC.

(1) Drawings showing pervious and impervious areas (copied or adapted from initial SWMP).

(2) Designation and description of each drainage area and how flow is routed to the corresponding facility.

B. Treatment and Flow-Control Facilities

(1) Drawings showing location and type of each facility

(2) General description of each facility (Consider a table if more than two facilities)

(1) Area drained and routing of discharge.

(2) Facility type and size

VI. Facility Documentation

A. "As-built" drawings of each facility (design drawings in the draft Plan)

B. Manufacturer's data, manuals, and maintenance requirements for pumps, mechanical or electrical equipment, and proprietary facilities (include a "placeholder" in the draft plan for information not yet available).

No manufactured components or proprietary BMPs used on Project.

C. Specific operation and maintenance concerns and troubleshooting

No specific concerns

VII. Maintenance Schedule or Matrix

A. Maintenance Schedule for each facility with specific requirements for:

(1) Routine inspection and maintenance
(2) Annual inspection and maintenance
(3) Inspection and maintenance after major storms

INSPECTION MATRIX

BMP	Inspection Indicators	Inspection Frequency	Minimum Frequency
Landscaping and Irrigation	Lawn grass longer than 2". Bushes, shrubs and trees growing into traveled ways.	Weekly during growing season. Bi-weekly during winter months.	Bi-Weekly
	Dead or dieing plant species.	Weekly during growing season. Bi-weekly during winter months.	Bi-Weekly
	Oversaturated ground, standing water and excess run-off.	Weekly during growing season. Bi-weekly during winter months.	Bi-Weekly
	Bare spots appear in planted/mulched areas or less than 70% coverage over entire area.	Bi-weekly during growing season. Monthly during winter months.	Monthly
Vegetated Swales	Average height of vegetation (grass) exceeds 4".	Inspect weekly and after rainy periods.	Weekly
	Bare spots appear in planted areas (less than 70% coverage)	Bi-weekly during growing season. Monthly during winter months.	Monthly
	Debris or litter accumulation.	During routine site landscape maintenance.	Weekly
	Sediment at or near vegetation height. Rills or gullies in topsoil.	Inspect monthly and after each significant rainfall.	Monthly
	Presence of pools of standing water.	Inspect monthly and after each significant rainfall.	Monthly
Integrated Pest Management	Presence of non-native plants or growth, especially in unwanted areas.	Seasonally at the minimum. Weekly during growing season.	Seasonally
	Presence of non-native or harmful insects. Plant growth destruction.	Seasonally at the minimum. Weekly during growing season.	Seasonally
	Presence of undesirable animals. Plant growth destruction. Animal scratches on trash dumpsters. Footprints in wet earth, trampled plantings.	Weekly during growing season.	Bi-Weekly
Trash Storage	Trash and debris on ground in area surrounding trash containers.	Weekly inspections at a minimum and prior to predicted rain event.	Weekly
	Lids of containers are open.	Daily inspections to prevent blowing of trash and debris and to discourage pest activity.	Daily
	Trash containers leaking.	Weekly inspection for liquid substances on ground around and under containers.	Weekly

MAINTENANCE MATRIX

BMP	Maintenance Indicators	Maintenance Activity	Frequency
Landscaping and Irrigation	Lawn grass longer than 2". Bushes, shrubs and trees growing into traveled ways.	Mowing of lawn areas. Trimming of bushes, shrubs and trees.	**Routine:** Weekly in season Bi-weekly out of season
	Dead or dieing plant species.	Remove and replace dead or dieing growth	**Non-Routine:** As required
	Oversaturated ground, standing water and excess run-off.	Adjust automatic sprinkler cycles for more frequent, shorter duration applications	**Routine:** Weekly in season Bi-weekly out of season
	Bare spots appear in planted/mulched areas or less than 70% coverage over entire area.	Reseed bare vegetated areas Redistribute or replace mulching where required	**Non-Routine:** As required
Vegetated Swales	Average height of vegetation (grass) exceeds 4".	Inspect weekly and after rainy periods.	**Routine:** Weekly in season Bi-weekly out of season
	Bare spots appear in planted/mulched areas or less than 70% coverage over entire area.	Reseed bare vegetated areas	**Non-Routine:** As required
	Debris or litter accumulation in swale or near inlet	Remove and dispose of properly	**Routine:** As required
	Sediment at or near vegetation height. Rills or gullies in topsoil.	Remove accumulated sediment. Regrade and reseed to remove rills and gullies.	**Non-Routine:** As required
	Standing water for more than 24 hours after storm event.	Remove accumulated water. Remove impediments to flow. Regrade and reseed as final resort.	**Non-Routine:** As required
Integrated Pest Management	Presence of non-native plants or growth, especially in unwanted areas.	Remove unwanted species. Replace with native types.	**Non-Routine:** As required Seasonally at minimum
	Presence of non-native or harmful insects. Plant growth destruction.	Manage unwanted insects with predatory species or plantings that discourage pest presence. Pesticide use as a last alternative.	**Non-Routine:** As required Seasonally at minimum
	Presence of undesirable animals. Plant growth destruction. Animal scratches on trash dumpsters. Footprints in wet earth, trampled plantings.	Manage unwanted animals by eliminating desirable environs. Use of humane traps for relocation. Use poisons as a last alternative.	**Non-Routine:** As required Seasonally at minimum
Trash Storage	Trash and debris on ground in area surrounding trash containers.	Place trash and debris in appropriate container. Consider increasing frequency of disposal.	**Routine:** As required
	Gates of enclosures and lids of containers are open.	Close open gates or lids. Install locks for access by authorized personnel only. Lids to be closed or secured when not in use.	**Non-Routine:** As required
	Leaking trash containers.	Leaking containers repaired or replaced (preferable.) Leaked materials to be treated as a spill.	**Non-Routine** As required

B. Service Agreement Information

No proprietary BMPs installed to provide service agreement information.

Assemble and make copies of your maintenance plan. One copy must be submitted to the County, and at least one copy kept on-site. Here are some suggestions for formatting themaintenance plan:

Format plans to 8½" x 11" to facilitate duplication, filing, and handling.

Include the revision date in the footer on each page.

Scan graphics and incorporate with text into a single electronic file. Keep the electronic file backed-up so that copies of the maintenance plan can be made if the hard copy is lost or damaged.

O&M BMP Site Inspection Checklist

GENERAL INFORMATION	
Project Name	Neumann TPM
Project N^{o}	
Responsible Party	
Inspector's Name	
Inspector's Title	
Signature	
Date of Inspection	
Inspection Type (Check Applicable)	❒ Prior to forecast rain ❒ After a rain event ❒ 24-hr intervals during extended rain ❒ Other _____ ❒ Periodical… ❒ Daily ❒ Weekly ❒ Bi-Weekly ❒ Monthly ❒ Seasonally ❒ Annually
Season (Check Applicable)	❒ Rainy ❒ Non-Rainy

INSPECTION OF BMPs			
Permanent BMP Indicators	**Inspected (Y/N)**	**Location of Indicator**	**Corrective Action**
Vegetated Swale Biofilters			
Grass height exceeds 4"			
Debris or litter accumulation			
Sediment accumulation at or near vegetation height.			
Rills or gullies in topsoil			
Landscaping & Irrigation			
Lawn grass longer than 2"			
Bushes encroaching into traveled way			
Shrubs encroaching into traveled way			
Bushes encroaching into traveled way			
Bare lawn/mulched areas, less than 70% cover			
Dead or dieing plants			
Trees encroaching into traveled way			
Ground Oversaturated by irrigation			
Standing water from irrigation			

O&M Maintenance Log of BMPs

Name of Responsible Party Performing Maintenance Activity: _____

The responsible party shall use the following log for reporting maintenance for BMPs identified in the Operation & Maintenance Plan		
PERMANENT BEST MANAGEMENT PRACTICES (BMPs)	**DATE OF MAINTENANCE**	**MAINTENANCE/REPAIR ACTIVITY**
LANDSCAPE & IRRIGATION		
VEGETATED SWALE		
Log Records must be maintained for five (5) years from date of maintenance activity.		

Additional pages for explanation of maintenance activity or contracted maintenance activity may be attached if necessary.

ATTACHMENT G

Tracking Report

COUNTY OF SAN DIEGO
DEPARTMENT OF PUBLIC WORKS
POST-CONSTRUCTION TRACKING AND
INVENTORY REPORT

General Project Information

Permit Number_____SWMP Category (Major/Minor) _____
Location / Address _____
Engineer of Work: _____State Registration Number: _____
Company Name: _____
Address: _____
Email Address: _____
Phone Number: _____

Priority Development Project – Step 1: _____

Percent Impervious Before Construction: %_____
Percent Impervious After Construction: %_____

Project Disturbed Area: _____Acres

Hydromodification Management – Step 3:
Yes ☐ or No ☐

Primary or Secondary Pollutants of Concerns – Step 4 *(check all that apply)*

- ☐ Sediment
- ☐ Nutrients
- ☐ Organic Compounds
- ☐ Bacteria and Viruses
- ☐ Trash and Debris
- ☐ Oxygen Demanding Substances
- ☐ Oil and Grease
- ☐ Pesticides

Project Specific Site Design, LID and Source Control BMPs

All selected Site Layout Strategies, LID, and Source Control BMPs must be shown on the Plan.

Site Layout Strategies – Step 5 *(check all that apply)*

- ☐ Limitation of Development Envelope
- ☐ Minimization of imperviousness
- ☐ Setbacks from creeks, wetlands, and riparian habitats
- ☐ Preservation of Natural Drainages
- ☐ Using drainage as a design element

Disperse Runoff from Impervious Surfaces to Pervious – Step 5 *(check all that apply)*

- ☐ Street and Road Design
- ☐ Driveway, Sidewalk, Bikepath Design
- ☐ Landscape Design
- ☐ Parking Lot Design
- ☐ Building Design
- ☐ Direct Runoff to Treatment BMP(s)

Source BMPs – Step 6 *(check all that apply)*

- ☐ Stormdrain Signage and Stenciling
- ☐ Trash Storage Areas
- ☐ Private Road Drainage System
- ☐ Dock Areas
- ☐ Vehicle Wash Areas
- ☐ Equipment Wash Areas
- ☐ Fueling Areas
- ☐ Outdoor Storage Areas
- ☐ Efficient Landscape Irrigation Design
- ☐ Residential Driveways & Guest Parking
- ☐ Maintenance Bays
- ☐ Outdoor Processing Areas
- ☐ Parking Areas

Post-construction Treatment Control BMP Information

Responsible Party for Maintenance – Step 8:
Name _____Phone Number (___) _____
Street Number _____Street Name _____
City _____ State _____Zip_____
Email Address: _____

Project Maintenance Category (1, 2, 3 or 4): ___

Project Specific Treatment Control BMPs

BMP Identifier*	BMP Type	BMP Pollutant of Concern Efficiency (H,M,L) – Table 11	Final Construction Date *(to be completed by County inspector)*	Final Construction Inspector Name *(to be completed by County inspector)*

* For location of BMP's, see approved Record Plan dated _____, plan sheet ____.

Record Plan Certification

I certify that the above items for this project are in substantial conformance with the approved plans. Yes ☐ or No ☐

Please sign your name and seal. [SEAL]

Print Name: _____

Sign Name: _____

ATTACHMENT H

Addendum